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The Material Background of the Earliest Civilization on the Mainland of Greece

# THE MATERIAL BACKGROUND OF THE EARLIEST CIVILIZATION ON THE MAINLAND OF GREECE

BY

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# INTRODUCTION

The purpose of this study is to reconstruct some features of the economic life of the early civilization on the mainland of Greece wholly from the archaeological evidence. As best suited to this purpose I have used the reports of the excavations at Tiryns, Mycenae, Orchomenos, and in Laconia as the basis of my investigation with some reference to Troy and to the prehistoric remains in Thessaly. The references to Troy are rather extended in the chapter on metals because this subject has been so well elaborated for this region by Wm. Dörpfeld in his great work, "Troja and Ilion". We may infer that much the same development took place at this time on the mainland because the relations between the two were rather close.

I have labored under some difficulty owing to the fact that much of the reading in preparation for this study had to be done in foreign languages so that most of my time was spent in collecting the evidence. Works in English on the subject are, in general, of secondary value. Many of Schliemann's conclusions have to be rejected in the light of more recent excavations. It is to be regretted that the proposed new edition of Tsountas-Manatt's "Mycenean Age" - the most valuable work in English - has never appeared. The present edition, published in 1897, sadly needs revision in view of the excavations in Crete and the consequent new orientation which all studies in this field must adopt.

Much of the latest work of the Germans - especially the complete report of the excavations at Tiryns by Rodenwaldt - I have been unable to investigate because of the great difficulty of securing books

from abroad just now. Also I have not been able to make use of several important works written in Modern Greek. An investigation of these works might add much to the details of our knowledge of the economic life of the Myceneans but I feel that the main features would remain unchanged.

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## I. DOMESTIC ANIMALS

Among the discoveries at Mycenae there are large numbers of animal bones which may give us some clue as to the knowledge of domestic animals in Mycenean times. Bones of swine, goats, sheep and oxen have been recognized with certainty. In the case of swine archaeological evidence shows us that there were wild swine in Ancient Greece just as there have been down to today. Tsountas - Manatt conclude that the mountains around Mycenae were in early times clothed with dense oak forests and they imagine many a glorious hunt in their glades[1]. But a fresco from the palace at Tiryns actually shows us the hunt[2]. A large wild boar is being pursued by the dogs and at the same time stabbed with spears. Sixty boar tusks were found in a grave at Mycenae[3]. They were flat on the reverse side and had borings to attach them to some object. There were also flat quadrangular pieces cut from boar's teeth with a hole at each end. These objects were doubtless helmet ornaments. The scene on the Warrior Vase[4] from Mycenae shows that the men wore such horns on their helmets. From this we might infer that the wild boar was very common. But the very large number of bones of swine as compared with those of other animals leads us to think that they could not all have been the product of the chase. "It may safely be asserted that the bones of swine exceed in quantity those of any other animal and only those of the sheep and goat together equal them."[5] Domesticated swine appear on none

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[1]Myc. Age, p. 69
[2]Dussaud, Civ. Prehell., Pl. C.
[3]Myc. Age, p. 196.
[4]Schuchhardt, Schliemann's Excav., fig. 285.
[5]Myc. Age, p. 69.

of the frescos or vase paintings. But this is not strange when we consider that the common pig is hardly an object to inspire an artist. From the evidence at hand we are not able to state conclusively that the Myceneans knew domesticated swine.

The story of the capture and subjugation of wild cattle is presented very graphically on the two gold cups from Vaphio. Keller[1] points out that the animals in this scene are treated mercifully. They are not wounded, killed or hunted with dogs. His theory is that possibly they were to be placed in the parks of the king to be hunted by him. Therefore unarmed slaves at the risk of their lives frightened the cattle into strong nets where they were caught, thrown down and hobbled. The one cup shows the circumstances after the capture and the other the capture itself. Another theory is that the peaceful animals were used as decoys for the wilder. But we may not infer too much regarding customs in Greece from this scene. The cups may have been made on the mainland but they are certainly products of Cretan art. The presence of the palm tree on the cup which shows the cattle in the wild state is a problem. It has not been determined whether these trees are the dwarf palm, which grew abundantly in Crete[2] or whether they are the true date palm. The latter tree was grown in Greece for purely decorative use and did not bear fruit. Perhaps we should conjecture the importation of the scene-motive from the East. Keller calls attention to the fact that the cattle on the Vaphio cups agree in the shape of the horns and in stature with those

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[1]Antike Tierwelt, p.343.
[2]Hehn, Kulturpflanzen, etc., pp. 284-5; 275-6.

on an Assyrian hunting relief of Assurnazirpal[1]. We may gain further information as to the knowledge of cattle among the Myceneans from the frescos. From the palace at Tiryns we have the representation of a man leaping over a bull[2]. This animal has rather a wild look in comparison with the repose of the standing steer in a wall painting from Orchomenos[3]. Bones of beeves are especially common beside the graves, where they doubtless formed part of the sacrificial feast for the dead. Small kine of clay and metal are found in the graves, possibly intended as substitutes for sacrifice. The silver ox-head with golden horns is prominent among the objects from Mycenae[4]. In the same grave were found fifty six small gold leaf replicas. These were probably symbols of the sacrifice for the dead. Small clay figures of cows which may have served the same purpose have been found at both Tiryns and Mycenae. Among the engraved gems from Mycenae many fantastic animals are pictured. But at least one (no. 22) shows us a quiet scene of pastoral life - a cow suckling her young[5]. The animal has been taken for a doe but judging from the tail and the horns it is certainly a cow. A gold ornament from a grave at Mycenae represents a lion attacking an ox.[6] This scene would most probably occur and would be brought

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[1]Antike Tierwelt, p.343.
[2]Schl., Tiryns, Pl. XIII.
[3]Bulle, Orchomenos, p. 79.
[4]Myc. Age, Pl. XIII.
[5]Eph. Arch., 1888, pl. 10.
[6]Myc. Age, p. 88.

to peolple's attention if the ox were a domesticated animal. Then it would be a serious economic loss if the flocks were attacked by lions. No doubt such misfortunes did happen, as we know from paintings and reliefs that the lion was a prominent figure in early Greece.

The domesticated sheep was probably introduced into Greece from Africa. A plate from Gizeh dated at 5-6000 B.C. shows a flock of African sheep[1]. These sheep have scalloped horns which stand out at right angles from their heads, while the Mycenean sheep represented on a gem from Vaphio have long backward curving horns[2]. But on a "sphinxwidder" of somewhat later date we find the same type of horns as those of the Mycenean sheep[3]. On another gem from Vaphio we have a picture of a helmet surmounted by a pair of ram's horns[4]. From Tiryns we have a rude clay object in the shape of a ram's head. Wild sheep of several species were known in Mycenean times. A gold pin from Mycenae shows a wild sheep similar to the Arabian arui[5]. A gem from the same place shows a woman grasping the head of a sheep-like animal of a somewhat different type[6].

We are unable to learn much about the domestication of the goat by the Myceneans. Hall[7] makes the statement that the goat was probably the most useful domestic animal that the Mycenaeans possessed.

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[1]Keller, Antike Tierwelt, fig. 106.
[2]Op. cit., fig. 108.
[3]Op. cit., fig. 114 b.
[4]Reichel, Homer. Waffen, fig. 41.
[5]Keller, op. cit., fig. 112.
[6]Op. cit., fig. 113.
[7]Hall, Aeg. Arch., p. 256.

But this statement requires proof which is not to be found in the archaeological remains. A fresco from the palace of Tiryns shows us the goat as the Myceneans knew it[1]. But we can not determine whether this animal is domesticated or whether it is an ibex or a wild goat. We know that wild goats existed in ancient Greece as they do today in the mountains of Northern Greece[2]. We have a representation of the ibex from the hunting scene on a stele at Mycenae. Sir Arthur Evans in his "Mycenean Tree and Pillar Cult" brings together many instances in which the wild goat appears in connection with cult scenes. A lentoid gem from Mycenae[3] shows two wild goats or agrimia standing back to back with a sacred tree between them. A gold ring from the same place[4] represents a man near a sacred tree with the agrimia behind him. This is the Cretan wild goat but its presence on these objects of a sacred character which have been found on the mainland surely indicate that this species was known here also.

It has long been the custom to regard the domesticated horse as introduced into Greece from the East. Professor Ridgeway, however, thinks it came from Libya[5]. All the representations of the horse at Tiryns and Mycenae show it in the domesticated state. One of the first finds from Mycenae - a stele from one of the graves - represented the horse and the chariot[6]. The horse and chariot was

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[1] Op. cit., fig. 112.
[2] Cf. Keller, Antike Tierwelt, pp. 296-299.
[3] Mycenean Tree & Pillar Cult (in J.H.S. vol. 21, 1901), fig. 30.
[4] Op. cit., fig. 55.
[5] B.S.A., vol. XI, p. 14.
[6] Myc. Age, Pl. XI.

used not only by warriors, as in this scene, but also for hunting. A bezel of a gold ring from Mycenae shows men in a chariot shooting at deer with the bow[1]. In a fresco from the palace at Tiryns the horse and chariot appear as if in a procession[2]. Tsountas-Manatt have no authority for the statement that "The noble animal was doubtless known to the Myceneans before the Phoenicians began to frequent their shores, but it it quite improbable that he had been subdued to the service of man"[3]. There is also no positive evidence for the inference that "for draught and burden the horse was little used, but this drudgery was reserved for the ox and possibly the mule"[4]. In no place do we see the ox or mule so represented. The case in regard to the mule is not clear. We have no representations of the mule itself but asses teeth have been recognized with hesitation in a tomb at Vaphio and from Mycenae we have the uncertain evidence of a fresco of ass-headed monsters[5]

Several frescos of the hunt from Tiryns show us conclusively that the dog was domesticated for the chase by the Myceneans. Among these is the fresco of the boar chase[6], where the dogs are in full cry after the boars. These dogs are a spotted, heavy tailed type. In the fresco they are white with dapples and spots of red, blue, and

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[1]Tiryns, II, Abb. 43 in Hall, Aeg. Arch., Pl. XXXII.
[2]Hall, Aeg. Arch., fig. 74.
[3]Myc. Age, p. 350.
[4]Op. cit., p. 351.
[5]Loc. cit.
[6]Dussaud, Civ. Prehell., Pl. C.

black. Probably this is only a peculiarity in the style of painting and we should not suppose the dogs were actually this color. Another fresco shows men leading large hounds to the chase[1]. A stele at Mycenae represents a horse and chariot under which runs one animal pursued by another. They have been taken for an ibex chased by a dog. But the second animal seems to have more characteristics of the lion than the dog[2]. We have representations of the dog apart from hunting scenes. A piece of late pottery from Tiryns shows the horse and the dog in a queer geometric style[3]. From Tiryns there is also a small clay stand on which is a rough figure of a dog[4].

We have no certain evidence that the Myceneans knew anything of poultry. Had they been familiar with domesticated fowl there would doubtless be some bones preserved among the quantities of bones of animals. But none have been recognized. Representations of ducks appear on vases from Argos[5] and Mycenae[6]. These may possibly have been domesticated, but we have no proof of this. The silver dagger blade from Mycenae which represents cats chasing wild ducks is so evidently a copy of Egyptian work that it can not be admitted as evidence. Doves appear on the golden model of a temple from Mycenae and on small figures of a goddess from the same place. These were doubtless sacred doves which were kept about the temple. They can not be

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[1]Hall, Aeg. Arch., fig. 73.
[2]Drerup, Omero, p. 205; Schuchhardt, Schliemann's Excav., p. 169.
[3]Schliemann, Tiryns, Pl. XIV.
[4]Op. cit., fig. 63.
[5]Dussaud, Civ. Prehell., fig. 126.
[6]Eph. Arch., 1891, pl. 3.

called domesticated but they were at least tame.

## II. FOOD

We are able to gain a pretty fair knowledge of some kinds of food which the Myceneans ate. In many places we have the actual remains of the food itself. The large number of bones of animals found at Mycenae indicates that the people were great meat eaters[1]. This is natural for a strong race of warriors as we know these Myceneans must have been. The bones of swine are so much more numerous than those of other animals that they must have been exceedingly fond of the flesh of this animal. Bones of goats, sheep, oxen, deer and hares have also been recognized. Many of these animals were doubtless products of the chase but others were domesticated and bred for the purpose of furnishing food. The bones are found in the debris of the earthen floors of the houses[2]. This fact is evidence that the Homeric custom of throwing the remains of the banquet upon the floor had its counterpart in the earlier civilization.

Shells of mussels, oysters and other shell fish which are to be found near the coast and in fresh water streams, are among the remains, but fish bones are entirely lacking in Tiryns and Mycenae[3]. Although fish along with other marine objects appear as decorations on pottery, they do not seem to have been used extensively at least as food.

We have abundant evidence as to the kinds of grain with which the Myceneans were familiar. In Orchomenos, which was the center of a great agricultural district, remains of grain are a frequent sight

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[1]cf. p. 3.
[2]Myc. Age, p. 68.
[3]Op. cit., p. 69.

even in the Early Mycenean stratum[1]. They lay in great heaps in the houses and have all been carbonized by the fire which destroyed this settlement. Barley, common wheat, the vetch, broad or horse bean, the checkling pea or vetch, and the three capsuled pea have been distinguished[2]. Wheat and peas are found together in large quantities in many places and barley and oats in at least one instance. Several kinds of grain have been found stored in large leaden jars at Troy. One jar alone contained 440 lbs. of peas[3]. Many of these storage jars were found imbedded in the earth in the middle of the passage way between the terrace and the walls of the Sixth city[4]. But they were also found in all layers in rooms of houses, in groups, or in special magazines. Such jars were found in large numbers at Mycenae also and they must have been used for the same purpose although no grain has been found in them there[5]. Several hand mills of trachyte for grinding grain have been found at Troy. This suggests the way in which the grain was probably used for food. It was ground into flour and may have been made into cakes or used in the form of gruel or porridge.

The vine was cultivated in Greece in the Mycenean period and wine was made from the fruit. Grape seeds[6] have been found in the second city of Troy and in the pre-Mycenean stratum at Tiryns,

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[1]Bulle, Orchomenos, pp. 60-61.
[2]Loc. cit.
[3]Myc. Age, p. 253.
[4]Dörpfeld, Troja and Ilion, p. 128.
[5]Op. cit., p. 73.
[6]Hehn, Kulturpflanzen, etc., p. 86.

but these are very small and may belong to the uncultivated wild grape. According to Professor Engler[1] the original home of the cultivated grape vine is on the south shore of the Caspian Sea and the land between the Caucasus and Taurus Mountains and Mt. Ararat. From here it was brought through Asia Minor to Greece. But doubtless the wild grape had been spread through southern Europe before this time. Birds would have carried the seeds and they would have grown wherever the climatic conditions were favorable. However, we know that the culture of the grape vine was well established in Greece by Mycenean times. In the early Mycenean stratum at Orchomenos grape seeds were found in a pithos along with some wheat grains. Grape seeds were also found in a grave of a little later period[2]. Traces of dregs of wine or vinegar have been found in the bottom of vases from Mycenae by Professor Tsountas[3]. The excavations by the British of some Mycenean remains near Sparta brought to light some fine craters and some curious clay sealings to stop the mouths of wine jars. They were tied in place with rushes and stamped with a seal which bore an intaglio design of animals[4]. It is natural to suppose that the many beautiful cups and goblets of gold and silver and especially the graceful amphorae were used as wine cups and wine jars.

The fruit of the olive tree and especially the oil from it were probably among the most valued possessions of the Myceneans. The olive was first brought under cultivation by the Semitic inhabitants of Southern Asia in very early times. It is known that it grew wild

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[1] Op. cit., pp. 86-87.
[2] Bulle, Orchomenos, pp. 60-61.
[3] Hehn, op. cit., p. 94.
[4] J. H. S., XXX, 1910, p. 359.

on the coast of Asia Minor, on the islands of the Aegean and in Greece[1]. It is possible that the Myceneans learned the culture of the olive from the east but we can not state this as a fact. Olive kernels have been found in both Tiryns and Mycenae[2]. Professor Tsountas has found about a dozen in ruined houses in Mycenae and one in the dromos of a Mycenean tomb[3]. The olive tree also appears in the artistic works of the period. One of the Vaphio cups shows a quiet pastoral scene in the midst of olive trees[4]. The Siege Scene on a vase from Mycenae shows olive trees growing before the walls of the city which is being besieged[5]. From Troy we have two trough shaped stones for the crushing of the fruit or the preparation of oil[6]. The finding of lamps at Mycenae and other places may point to the use of olive oil for burning in them[7].

It has long been supposed that the culture of the fig was introduced into Greece from the East only in very late Mycenean times[8]. But the discovery of figs in the neolithic remains of Thessaly makes this theory untenable[9]. The finding of figs at such an early date makes it probable that they were indigenous and cultivated in Greece long before Mycenean times. At Alt-Pylos the British excavators found a magazine in which were six pithoi filled with figs[10]. The fruit was

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[1]Hehn, Kulturpflanzen, etc., p. 103.
[2]Myc. Age, p. 79.
[3]Loc. cit.; Hehn, Kulturpflanzen, etc., p. 120.
[4]Hehn, loc. cit.
[5]Loc. cit.; cf. also Myc. Age, fig. 95.
[6]Dörpfeld, Troja und Ilion, p. 400.
[7]Myc. Age, p. 79.
[8]Hehn, op. cit., p. 101.
[9]Wace and Thompson, Prehis. Thess., pp. 43, 73.
[10]Ath. Mit., vol. 32, p. XIV.

black and hard and pressed close together but the firm skin and the seeds on the inside were recognizable.

The Myceneans probably never produced, in quantity at all events, the fruit of the date palm. This tree was brought to Greece from the Orient in the same way as the fig and the olive. But the climatic conditions were not favorable. Therefore the date palm never bore fruit in this Mediterranean land but served merely as an ornament to the landscape[1]. So we have representations of it frequently in the artistic works but no traces of the fruit are found in Greece.

We have no archaeological evidence to show that the Myceneans used milk and cheese. But traces of these foods could hardly be preserved and their absence in artistic works can be accounted for. If they had domesticated cattle and goats it is quite probable that they used milk and cheese as foods. They may also have used honey. The bee appears on some of the round gold ornaments from Mycenean graves[2]. From the evidence at hand we can not say they raised bees for their honey but this is possible. They must at least have known wild honey.

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[1]Hehn, Kulturpflanzen, etc., p. 272.
[2]Schuchhardt, Schliemann's Excav., fig. 193.

## III. AGRICULTURE AND COMMERCE

It is most probable that the Myceneans were originally an agricultural and pastoral people[1]. All the evidence available seems to indicate that they were not a sea-faring race. In the first place, the situation of their cities does not favor such a theory. With the single exception of Tiryns, none of them are on the sea or near the sea. Tiryns was evidently not located with reference to its position on the sea for it has a very poor harbor, although an excellent one offered itself bear by. Moreover, the main entrance to Tiryns is not toward the sea but on the landward side. The total absence of fish bones from the Mycenean remains and their seeming abstinence from fish as a food would also indicate that they were not familiar with the sea. Another striking confirmation of this view is the rare appearance of ships in artistic works. Only one representation of a ship has been found in Mycenean remains[2]. It is possible that fish bones might fail to be preserved. But the fact that we have nowhere evidence of fishing as an occupation among them strengthens the theory that they were unfamiliar with the sea and its pursuits.

We are unable to learn much concerning the development of agriculture among the Myceneans from the artistic remains. "The artist, who wrought mainly for princes, has given us no such picture of ploughing, harvest, and vintage as charm us on the Homeric shield

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[1]Myc. Age, pp. 332-334. I have made here a brief summary of the argument of Tsountas-Manatt.

[2]Op. cit., fig. 158.

of Achilles"[1]. The very location of the cities, while it argues against the supposition that the Myceneans were a sea-faring race, supports the theory that they were an agricultural and pastoral people. The fortress of Tiryns rises in the midst of fertile plains[2]. The citadel of Mycenae seems to have been occupied only by the king and his retainers, while the mass of the people lived on the adjacent slopes and ridges[3]. Here they probably tilled their fields and tended their flocks. We know that Orchomenos was the center of a rich agricultural district because of the great dikes which were built to drain the land around Lake Copais[4]. By means of this great engineering work a swampy area was reclaimed and brought under cultivation. The extensive remains of grains, which we have described in connection with our treatment of foods (p. 12), are very real evidence as to the development of agriculture in these times. The great variety of grains found indicates a considerable degree of advancement.

But it is impossible to account for the vast wealth and treasures of the Mycenean cities on the basis of agriculture alone. Commerce must have existed very early between neighboring tribes and articles from the East may even have found their slow way overland[5]. Mycenae, because of its location between the Eastern and Western Seas, was in a favorable position for trade. Traces of ancient road tracks from Mycenae to Corinth branch out in three directions and would seem to indicate extensive intercourse with this city[6]. But the great

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[1]Myc. Age, p. 353.
[2]Op. cit., p. 18.
[3]Op. cit., p. 32.
[4]Curtius, Deichbauten der Minyer.
[5]Myc. Age, p. 354.
[6]Schuchhardt, Schliemann's Excav., pp. 134-135.

palace at Tiryns doubtless belongs to a period of prosperity caused by active commercial relations with the islands and coast towns. We must look to the Minoan civilization of Crete as the real basis of the wealth of the Mycenean cities. The Minoan objects found in Tiryns, Mycenae and other places point to the late middle Minoan period as the time when the Cretans first came to the mainland[1]. It was probably they who first showed the Myceneans the benefits of foreign trade and it was they who began trading operations on a large scale. The evidences of trade with Crete on the mainland are almost innumerable. The Vaphio cups, many of the finest frescos and much of the fine pottery found on the mainland are probably of Cretan workmanship. Some are undoubtedly importations and the others, if made in Greece, are from Cretan models and made by Cretan artists.

Trade with the East and especially with Egypt was developed to an extent which causes us to marvel. The finding of the shell of an ostrich egg in the ruins of Mycenae was one of the very first indications of this Eastern trade[2]. Not only have objects of Egyptian ware been found in Mycenae but Mycenean objects were found in Egypt also. In a tomb at Kahun dated approximately at 1100 B.C. Flinders Petrie found a vase with an ivy leaf and stalk on each side[3]. A vase with a similar design is shown from Mycenae[4]. At Gurob he traced the Mycenean "Bugelkanne" through a series of stages. The tomb frescos

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[1]Hall, Anc. Hist. of Near East, p. 58.
[2]Myc. Age, p. 104.
[3]Op. cit., p. 318.
[4]Op. cit., fig. 123.

of Thebes, which show tributaries bringing gifts to Thotmes III (about 1500 B.C.) represent some who are bearing Mycenean vases[1]. Among the works actually imported from Egypt are two in fayennce - a statuette of an ape with the seal of Amenophis II and a vase with the seal of Amenophis III[2]. Scarabs bearing cartouches of Amenophis III and his queen Ti have been found at Mycenae[3]. The reign of this monarch is placed in the latter half of the fifteenth century. These facts would seem to indicate that from the fifteenth century at least there was trade between Egypt and Mycenae. And this period is regarded as that of the greatest development of Mycenean civilization on the mainland[4]. Many works of art among the gold offerings from the graves are either importations from the Orient or imitations of such imports produced in Greece. Among these is the inlaid dagger-blade showing cats chasing wild ducks along a stream with papyrus plants growing on the banks. This is clearly a scene of wild life on the Nile[5]. A silver cup from Mycenae pictures lotus flowers such as grow in the Euphrates valley and in Egypt[6]. Several objects of Egyptian porcelain - a knot from Mycenae and a small helmeted head - are further indications of trade relations with Egypt[7]. And indeed the list of such objects might be extended almost indefinitely. The abundance of objects of gold, silver, and bronze is remarkable in view of the fact that metals

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[1] Op. cit., p. 319.
[2] Dussaud, Civ. Prehell., p. 156.
[3] Myc., Age, loc. cit.
[4] Hall, Aeg. Arch., p. 5, identifies the Late Bronze Age in Europe with the XVIII and XIX dynasties in Egypt - an approximate date of 1600-1200 B.C.
[5] Myc. Age, p. 231, fig. 115.
[6] Op. cit., fig. 37, p. 100
[7] Schuchhardt, Schliemann's Excav., p. 208, fig. 198; p. 265.

are rather scarce in Greece. They probably looked to the East for their supply of all three metals[1]. Silver came into use only late in the Mycenean period and the knowledge of this metal probably came from the East. Gold they probably obtained from Asia Minor and copper from Cyprus. Ivory which must have come from the Tropics or Mesopotamia is frequent[2]. The large number of objects made of these precious materials presupposes a considerable amount of trade. The amber beads found in the graves of Mycenae, according to chemical analysis are from the region of the Baltic Sea[3]. In the third stratum at Hissalrik, Dr. Schliemann found a chisel of white jade. Hitherto pure white jade has been found only in China. This fact gives hints of a trade route to Central Asia even in the early period of Troy[4].

Pottery must have been the great staple in the trade of the Myceneans. They doubtless imported some pottery, "Some of the finer monochromes found on the Greek mainland or in the Peloponnesus are so clearly of the Trojan type that we may assume their importation from the Troad. And apparently this importation continued even after Greece had begun to export to Troy her fine glazed ware"[5]. This lustrous painted ware of the Greeks is found on three continents - at Troy, Caria, Cyprus, Egypt, and even in Sicily[6]. The predominance of marine designs in the decoration of the vases points to a place near the sea as the

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[1]Myc. Age, p. 350.
[2]Op. cit., p. 357.
[3]Op. cit., p. 180.
[4]Schuchhardt, Schliemann's Excav., p. 38.
[5]Myc. Age, p. 240.
[6]Op. cit., p. 358.

center of their manufacture. No fixed place has been found as yet, but Tsountas-Manatt think that Argolis was probably the producing and exporting center[1]. Although the vases show great uniformity of shape and design, it would be wrong to suppose they were all made in the same place. Local differences are plainly discernible. In one place the old Oriental style was preserved, while in another the painter used the new lustrous paint and imitated every living form with his brush[2].

There are many indications of trade between the Mycenean cities and the West. "In fact, it was through Hellas - in part at least - that farther Europe communicated with the East and it was at Mycenean hands that she received from the East many of the most essential elements of her civilization"[3]. Mycenean fibulae have been found in the Italian terremare and in Hungary, Bosnia and Switzerland. The Mycenean sword has been regarded as the archetype of nearly all the swords of the Bronze Age through out all Europe.[4]

This extensive trade would seem to demand some well developed system of exchange, though, of course, not coins as a medium of exchange, as coined money was an invention of a much later age. Some Mycenean gold rings and a bracelet found at Aegina may offer a suggestion as to what they really did use[5]. It has been found that the bracelet is six times the weight of the rings, which weigh approximately 8.4 grams or about 130 grains each[6]. The weight of these objects seems to answer to a definite standard, "and there is every reason to suppose, from their

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[1]Myc. Age, p. 245.
[2]Schuchhardt, Schliemann's Excav., p. 190.
[3]Myc. Age, pp. 358-359.
[4]Op. cit., p. 359.
[5]Op. cit., pp. 392-393.
[6]Loc. cit.

non-ornamental form, that they actually served as ring money"[1]. This conclusion is strikingly corroborated by Professor Ridgeway's study of the rings and spirals found in the graves at Mycenae. They seemed to be based on a standard weight of about 135 grains[2]. So the metric system of Aegina evidently "goes back to the palmiest days of the Mycenean civilization"[3].

In Troy the development of a medium of exchange may be observed from the most primitive form. The lowest step, in which the need of greater or lesser weight is felt, is shown by pieces of gold of different sizes whose weight would have to be determined by actual weighing[4]. Miniature balances which are found in one of the women's graves at Mycenae might indicate the same practice there[5]. Sixteen notched electron bars found at Troy indicate a step in advance. They were notched to make the valuation easier or perhaps their worth could be determined in this way without weighing[6]. The last step is shown by tongue shaped silver bars which probably had a certain value according to their shape[7]. Dr. Schliemann thought these might be the Homeric talent[8].

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[1] Loc. cit.
[2] Loc. cit.
[3] Loc. cit.
[4] Dörpfeld, Troja und Ilion, p. 361.
[5] Schuchhardt, Schliemann's Excav., p. 206.
[6] Dörpfeld, loc. cit.
[7] Dörpfeld, Op. cit., p. 362.
[8] Schuchhardt, Schliemann's Excav., p. 61.

## IV. METALS

Metal work among the Myceneans seems to have reached a stage of development which in some ways can hardly be surpassed even at the present day. They had a variety of metals with which to work. Gold, silver, copper, bronze, and lead they knew certainly, and possibly iron. Gold must have been used very lavishly, especially in the adornment of the person. Golden ornaments of all kinds are found in great abundance. The tombs excavated by Dr. Schliemann at Mycenae brought to light a wealth of gold ornaments which was astounding[1]. Gold and silver are used for the smaller kinds of vessels - cups, bowls, and flagons - such as might be used at feasts or sacrifices[2]. To this class belong the splendid Vaphio cups which we have mentioned before. We see gold employed in inlay work in the dagger blades from Mycenae, the technic of which will be described later. Tsountas-Manatt think the furniture of the Myceneans may have been inlaid in gold, silver, bronze, and ivory. Of course this is a supposition which can not be proven by any archaeological evidence as the furniture has long ago perished. But in view of the lavish use of gold for purposes of display, the idea seems plausible. A number of bars of gold have been found at Troy which Dörpfeld assumes to have been the property of some wealthy woman who would give them to the gold smith to be made into ornaments at need[3].

Silver seems to have come into use at a later period than gold and it was never so widely employed[4]. It is not used much for

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[1]Tsountas-Manatt, Myc, Age, pp. 88-91 and pp. 98-105, give an inventory of the objects found in these graves.
[2]Op. cit., p. 74.
[3]Dörpfeld, Troja und Ilion, p. 342.
[4]Myc. Age, p. 350.

jewelry but appears in vases and show weapons[1]. Among these are the vase with the Siege Scene from Mycenae and the silver cup with lotus flowers inlaid in gold. Silver is also employed in inlay work. In one of the dagger blades from Mycenae we see it mixed with the gold to lighten the color[2]. Electron - a composition of gold and silver - was also known to the Myceneans. It appears most frequently at Troy where it is used for vessels and in a few cases for ornaments[3].

Bronze is the standard metal among the Myceneans for all ordinary vessels and armor[4]. One of the unsolved problems of the Mycenean age is as to whether the Bronze Age culture was preceded by a Copper Age. In Troy where the development from neolithic times may be traced there seems to be no distinct Copper Age but copper and bronze objects appear side by side[5]. At Mycenae also many huge copper jars and cauldrons appear in the same tomb with bronze armor and utensils[6]. But copper was not adapted to many uses and bronze came to be employed more and more. It is believed that bronze was used to decorate the walls of the bee-hive tombs at Mycenae. Holes are seen in which the bronze ornaments may have been fixed and bronze nails remain which may have been used for affixing plates of bronze[7].

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[1]Dörpfeld, op. cit., p. 366.
[2]Schuchhardt, Schliemann's Excav., p. 231.
[3]Dörpfeld, op. cit., p. 349.
[4]Myc. Age, p. 223.
[5]Dörpfeld, op. cit., p. 366.
[6]Myc. Age, p. 73.
[7]Op. cit., p. 120.

Lead was not used very extensively by the Myceneans. The large leaden jars no less than three feet in height found at Mycenae are the most notable examples of its employment[1]. At Troy lead seems to have been used only in small quantities and for small objects[2]. Tin is found only in bronze. Objects of pure tin are not known and it is doubtful whether it was known as an independent metal. The bronze may have been introduced as a prepared alloy[3].

There is some uncertainty as to whether iron was known to the Myceneans. If they did know it, it was not until late in the Mycenean period and then its use was not extended. It did not appear in large enough quantity to change the nature of the bronze culture[4]. Tsountas-Manatt say that it was known toward the end but it was rare and was used only for ornaments. They remark that it is found only four or five times with proper Mycenean objects and then in the form of rings[5]. Dörpfeld reports that iron objects are not known in the Sixth or Mycenean city of Troy[6]. But in the earlier period he believes that iron may possibly have been present because of the rusty surface of a silver cup which must have been in contact with some iron object in the earth[7]. He also reports a shapeless mass of iron in the fifth stratum[8]. Another

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[1]Myc. Age, p. 73.
[2]Dörpfeld, Troja und Ilion, p. 367.
[3]Loc. cit.
[4]Op. cit., p. 368.
[5]Myc. Age, p. 72.
[6]Dörpfeld, Troja und Ilion, p. 396.
[7]Op. cit., p. 367.
[8]Op. cit., p. 368.

rust-brown object - a sphere blunt at the pole with a hole in the middle - was found on analysis to consist of an iron mineral[1]. But no iron objects of certain date have yet been found.

Dörpfeld has made a careful study of the metals and their alloys as they appear at Troy[2]. He finds that the gold used for ornaments, vases, and bars is of extraordinary purity. While 14 karat gold is the standard for jewelry among us, some of the vases found at Troy are 23 karat or 96% pure gold. Electron shows the proportion of gold to silver in some cases as two to one and in others as four to one. But it has not been determined whether this is a natural or an artistic mixture. Pure silver is used for a few vases and others are 5% copper. The tongue-shaped bars found at Troy contain 3½% copper. The proportion of tin in the bronze objects varies but is usually about 10%. This holds true for objects at Mycenae as well as at Troy[3].

Dörpfeld has also studied the evidence found at Troy as to the knowledge and advancement made in the technique of casting metals[4]. He says there are many moulds at hand to show that they used open casting. In this process the fluid metal is poured into an open hollow in the form of the article to be made. Stone moulds were used on some or all sides. They are of soft stone such as could be cut with an axe or a knife. In a few cases moulds are made of thick sherds of large

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[1] Op. cit., p. 338.
[2] Op. cit., pp. 365-367.
[3] Myc. Age, p. 73.
[4] Dörpfeld, Troja und Ilion, pp. 368-369. I have followed Dörpfeld's discussion very closely in my treatment of this subject.

pithoi. That open casting is the process used is shown by the character of some of the objects found. Only one side is correctly modeled while the other remains plain. Many of the objects made by this unsymmetrical casting process show traces of having been further worked with a hammer. This is especially true of the dagger blades. Many of them, however, are left with one side ridged and the other quite flat.

There is some uncertainty as to whether box casting was used or not. A few objects seem to approach this method in their technic. Moulds with an ingot canal have been found but the holes for the plugs with which the two parts of the mould would have to be held together are lacking. The upper part of the moulds which have been found are too uneven for a lower half to have fitted on them. Pouring funnels of clay and stone have been found which would seem to indicate that box casting was used. Dörpfeld assumes that casting in wax moulds must have been used because of the complexity of certain dagger forms, handles on pails, and similar objects.

Besides the casting process, hammering and beating was used on bronze objects. We have mentioned the dagger blades which show traces of having been worked with a hammer. This process reaches the highest point of development in beaten vases made in one piece but these are probably to be ascribed to a later period[1].

Great skill is also shown in the joining of metals[2]. The most primitive method is to stick metals together by rabbetting. In this way the edge and handles of most of the bronze kettles are put

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[1]Dörpfeld, Troja und Ilion, p. 369.
[2]Loc. cit.

on. The process of riveting also is not rare. Knife and dagger handles are commonly put on by this method. A vase from Troy shows golden eagles put on in this way. Soldering is brought to a very great degree of skill. This is best seen in the fine filigree work in gold earrings. Most of the handles of vases and feet of jugs are soldered on. It is not known whether they could solder other metals than gold and silver as the bronze objects are too much oxydized to distinguish fine points of technic.

The goldsmith's art attained its highest degree of perfection among the Myceneans. Practically every process known to moderns was employed[1]. "The yellow metal is beaten out into sheets of marvelous delicacy for overlaying some grosser fabric; and on it they stamp their familiar motives as well as figure subjects exquisite in design and execution. Or the metal is hammered or drawn out into fine wire for chains and the like and granulation is not only known but freely employed"[2].

In a grave at Mycenae, containing the skeletons of several men, were found a number of gold plates which Schuchhardt supposes to have ornamented sword sheaths[3]. The core of the ornaments, made of bone or wood, may be seen under the gold plate in places. Schuchhardt describes the process of their manufacture as follows: "The pattern

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[1]Myc. Age, p. 219.
[2]Loc, cit,
[3]Schuchhardt, Schliemann's Excav., p. 233.

afterwards reproduced in repousse by the gold plate was first carved in relief on this wooden core. Apparently the smooth gold plate was firmly attached to the core, and then pressed down hard, while the lines were followed with a pointed instrument until the pattern was fetched up to the surface"[1]. The same method was used for the round gold plates with repousse work in beautiful designs which were found in women's graves and are thought to have been used as ornaments for dresses[2]. Schuchhardt assumes that the same method was used for the gold masks, diadems, and other objects of the same character[3].

The gold plates which Schuchhardt describes are lozenge shape and a notable peculiarity of their construction as he describes them, is the large bosses in the shape of round discs attached in groups of two or three to the angles of the lozenge. The centers of these lie outside the edge of the lozenge. Schuchhardt thinks they represent the broad nails or tacks which fastened the object to the thing it was to decorate. Since the nails are never driven through the lozenges he supposes that the models for these plates were made of some material difficult or dangerous to pierce, such as gems, amber, or rock crystal[4]. But he points out that the designs are not suited to material of this kind but are peculiar to metal work[5].

Although we can not be certain that the Vaphio cups were made on the mainland, they are a product of the Mycenean Age. Tsountas-Manatt

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[1]Schuchhardt, Schliemann's Excav., pp. 233-234.
[2]Op. cit., p. 202.
[3]Op. cit., p. 234.
[4]Loc. cit.
[5]Loc. cit.

in describing their workmanship, say "The Vaphio cups are the master pieces of the Mycenean goldsmith - indeed of all Mycenean art. The outer wall is a plate of pure gold bearing the design in repousse and riveted end to end at the handle: while a second plate gives a smooth lining and is turned over to form the rim. The cups are thus quite seamless except at the joining and this is practically covered by the handle"[1].

Perhaps the greatest triumph of the Mycenean goldsmith is in inlay work. The designs inlaid in different metals have the effect of painting in colors. The dagger blades found in the graves at Mycenae are the finest examples of this sort of work. One of the best known of these is the one which depicts the lion hunt. In this the metals are inlaid on a thin bronze plate which is let into the blade. The lions and the naked parts of the men are in gold. The trousers and shields of the men are in silver. The manes of the lions, the rims, straps, and the device on one shield are of some dark substance. The ground also is covered with a dark enamel which makes the figures detach themselves better[2]. Another blade which represents three running lions is treated in a different manner. Here the lions are worked in relief on a bronze plate which is inserted in the blade and covered with thin gold leaf. The manes of the lions are in redder gold and the lines on their bodies are lighter. This is accomplished by an admixture of copper and silver[3].

Several silver objects show an application of gold. Among these is the vase showing the Siege Scene in which small Minoan figure - eight shields are soldered onto the silver[4]. A silver cup from Mycenae

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[1]Myc. Age, p. 227.
[2]Schuchhardt, Schliemann's Excav,, p. 230.
[3]Op. cit., p. 231.
[4]Hall, Aeg. Arch., p. 57.

shows in three places around the circumference pots of lotus flowers inlaid in gold while below these designs is a ring of little inlaid gold plates running around the cup[1].

Another beautiful example of inlay work is the scepter from one of the graves at Mycenae. It consists of a golden cylinder and a splendid handle which undoubtedly go together to form the pommel and sheathing of a scepter. "The golden cylinder consists of four-leaved flowers united at their points, each petal being inlaid with a nicely fitting piece of rock crystal, as were also the spaces between the flowers. The golden pommel has the form of a scaly body of which each extremity is finished off with a dragon head. The scales are rendered by bits of rock crystal so nicely fitted to the gold that only one of them has fallen out. This hollow pommel still retains some of the wood with which it was filled"[2].

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[1]Schuchhardt, Schliemann's Excav., p. 240.
[2]Myc. Age, pp. 167-168.

## V. CLOTH AND LEATHER.

We have abundant evidence to prove that the Myceneans were familiar with both linen and woolen cloth. Remains of linen have been preserved in several places. In Mycenae Dr. Schliemann found particles of linen sticking to the blades of daggers[1]. "With many of the swords I found traces of well woven linen still attached to the blades; and there can consequently be no doubt that many swords had linen sheaths"[2]. At Troy part of a charred wooden spindle was found with remains of thread would around it[3]. A clay box was also found which contained remains of cotton and linen material[4]. The charred mass of material at this place also brought to light part of a wooden spindle with linen or woolen thread wound on it[5].

Instruments for spinning have been found in large numbers at all sites and in all layers. Spindles of bone and wood have been found at Troy, as we have mentioned above, and they have been found even in the layer preceding the Mycenean. Whorls are found in large numbers and at many sites. Those from Troy are generally of terra cotta and are of several different shapes. They are decorated with simple linear incised patterns and the incisions are filled with chalk[6]. Dr. Schliemann reports having found more than 350 whorls at Mycenae[7]. He also found many cone shaped whorls of blue stone or steatite at Tiryns[8].

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[1]Schuchhardt, Schliemann's Excav., p. 233.
[2]Schliemann, Myc., p. 283 in Myc. Age, p. 203, n. 1.
[3]Dörpfeld, Troja und Ilion, p. 390.
[4]Op. cit., p. 340.
[5]Loc. cit.
[6]Schuchhardt, Schliemann's Excav., p. 42.
[7]Schliemann, Tiryns, p. 81.
[8]Loc. cit.

Schuchhardt describes the manner in which these whorls were used from analogy with the later Roman custom. "Their use was to weight the wooden spindle fastened to the end of the yarn, and thus to facilitate twisting the latter into thread. The yarn is drawn from a distaff; when it is so long that the spindle with its whorl nearly touches the ground, the thread is wound round the spindle, made fast in a notch and the process begins anew"[1]. Objects which have been taken for spools on which to wind thread have been found at Troy and Tiryns[2]. They are made of clay or stone and are simply flat ovals notched on either side.

From the abundance and wide distribution of spinning instruments we may assume that each household manufactured cloth sufficient for its own needs. Dörpfeld, however, reports having found fifty loom weights in a work room in Troy[3]. This room was part of a dwelling house and contains pithoi and other vessels in addition to the loom weights[4]. We can not use this as evidence that cloth manufacture was carried on in any manner resembling a factory system, except possibly for some of the finer grades which housewives might not be able to produce. Possibly we have here gathered into one place the weaving industry of the palace which would doubtless be extensive.

Many of the vase paintings and frescos of the period display the Mycenean costume, from which we may infer something as to their knowledge of the manufacture of cloth. A lead statuette found at Kampos in Laconia shows only the breech-cloth or loin apron and this was

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[1]Schuchhardt, Schliemann's Excav., p. 42.
[2]Op. cit., fig. 117; cf. also Dörpfeld, Troja and Ilion, p. 400.
[3]Dörpfeld, op. cit., p. 399.
[4]Op. cit., p. 160.

probably the original Mycenean costume[1]. The later Mycenean costume as it was developed differed greatly from the Cretan. As the Myceneans lived in a cooler climate a warmer costume was necessary[2]. The Warrior Vase from Mycenae shows us the later costume of the men very clearly[3]. They are wearing the linen chiton partly covered by a coat of mail[4]. In a wall painting from Mycenae we have a man wearing a pale yellow chiton[5]. The same style of dress appears also on the helmeted warrior at the bottom of the Siege Scene from Mycenae[6]. A fresco from the palace of Tiryns shows a man with exactly the same costume, which Hall describes as a chiton or jacket-shirt[7]. We may assume that this garment is of linen because of its appearance and because of the remains of linen material which have been found. Tsountas-Manatt think the linen chiton is of Eastern origin[8].

But the chiton could not serve as an all-year-round costume and so the thick woolen cloak on chlaina was necessary[9]. It appears on two old men behind the bowmen in the Siege Scene[10]. This cloak appears not to be fitted or sewed but is "simply the great thick woolen web as it came from the loom"[11]. Many brooches or fibulae of bronze, much like the modern safety pin in appearance, have been found at Mycenae. Some of these were doubtless used to fasten the chlaina at the shoulder[12].

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[1]Myc. Age, pl. XVI.
[2]Hall, Aeg. Arch., p. 233.
[3]Myc. Age, pl. XVIII.
[4]Op. cit., p. 162.
[5]Op. cit., fig. 15.
[6]Op. cit., fig. 95.
[7]Hall, Aeg. Arch., fig. 95; cf. also p. 234.
[8]Myc. Age, p. 161.
[9]Op. cit., p. 162.
[10]Op. cit., fig. 95.
[11]Op. cit., p. 163.
[12]Loc. cit.

The ladies of Mycenean times wore rather elaborate costumes but they too were probably confined to linen and woolen material for the making of them. "Silks and satins she has none, but soft woolen of sea purple stain, and glistening linen which even without enbroidery might shine like a star in that radiant atmosphere"[1]. It is not strange that we have nowhere any traces of embroidery work preserved. Such figures as those in the solemn procession on a fresco from Tiryns lead us to believe that their costumes must have been elaborately embroidered[2]. Needles are common among the remains. Those from Troy are of bone or ivory[3] but silver and bronze ones have been found at Vaphio[4].

We have no actual remains of leather from the Mycenean period but from the evidence of paintings and other monuments we may be fairly certain that men did have some knowledge of its manufacture. In the first place, the figures in most of the paintings wear shoes or sandals of some kind. The men on the Vaphio cups have shoes which seem to be fastened half way up the calf of the leg by horizontal thongs[5]. These shoes are slightly turned up at the points. It has been observed that the turned up toe is invariably the custom on Hittite monuments, but this need not indicate that the Myceneans derived the custom from the Hittites for the same custom has been observed in many other periods and regions and is particularly characteristic of the national costume of Modern Greece[6]. The bull leaper from Tiryns wears the same kind of shoes but he has additional bands about his knees which indicate that

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[1] Op. cit., p. 189.
[2] Hall, Aeg. Arch., fig. 76.
[3] Myc. Age, p. 349n.
[4] Op. cit., p. 144.
[5] Schuchhardt, Schliemann's Excav., p. 121.
[6] Myc. Age, p. 164.

he is wearing greaves[1].

The feet of the men on the Warrior vase are also protected by shoes of some kind. The toes here are also decidedly pointed. In addition to the protection of their feet, the legs from the knees down are protected by greaves or gaiters[2]. Schuchhardt supposes these to have been pieces of cloth or leather bound round with bands or thongs[3]. Greaves fastened by leather bands are shown on several engraved gems but are to be seen more clearly on the Warrior vase and the bull leaper from Tiryns[4]. That greaves of cloth or leather were worn is attested by the gold gaiter holders from the graves at Mycenae[5]. According to Hall[6] the band of this holder was fastened around the leg below the knee and a vertical strip hanging down in front held up the greave by means of a loop fastener on a button or peg on the greave. The greaves which are shown on a fresco from Mycenae are probably fastened in this way[7]. Such an arrangement demands that the greaves be of such a material as leather or cloth. Since the evidence is almost conclusive that they used leather for other articles we may assume that this was the material of the greaves. We know that in later times the Greeks wore metal greaves some of which have been preserved. But no metal greaves have

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[1]Schuchhardt, Schliemann's Excav., p. 121; cf. also fig. 111.
[2]Op. cit., p. 280.
[3]Loc. cit.
[4]Myc. Age, p. 195.
[5]Loc. cit.
[6]Hall, Aeg. Arch., p. 246.
[7]Op. cit., fig. 69.

been found among Mycenean remains[1]. If they were not made of metal, leather seems to be the next best material for protection.

The ordinary head gear and the helmets of the Myceneans show us another use which they made of leather. The ancient statuette from Kampos in Laconia[2] shows a sort of ribbon wound two or three times around the head. It has been supposed that this is possibly a cap of leather straps stitched together as is later seen on the warriors[3]. It seems to be the opinion of all scholars that the Mycenean helmet was a leather cap. No helmets of metal have been found but the monuments have preserved several helmets for us[4]. The beautiful ivory head from Mycenae gives us one of the best representations of the Mycenean helmet[5]. "Perrot takes it for a leather or felt cap, covered with metal plates fastened together by circular strips, likewise of metal, narrowing from base to crown"[6]. Reichel "sees in it simply a cap of woven leather, and in the cheek-piece or chin-band a braided beard"[7]. A fragment of Egyptian porcelain from Mycenae shows a similar head[8]. "The helmet is low and fits closely to the head. It consists of several superimposed bands, each of which is separately plaited, probably out of leather thongs. Over the ear can be seen the chin strap"[9]. Hall[10] speaks of

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[1]Myc. Age, p. 194.
[2]Cf. p.
[3]Myc. Age, p. 165.
[4]Op. cit., p. 196.
[5]Op. cit., fig. 85.
[6]Op. cit., p. 197. n. 1.
[7]Loc. cit.
[8]Schuchhardt, Schliemann's Excav., fig. 198.
[9]Op. cit., p. 208.
[10]Hall, Aeg. Arch., p. 244.

it as being made of "horizontal rolls of leather" and this seems to answer more nearly to the appearance of the helmet.

It is quite probable that the Myceneans wore their swords upon sword belts of leather or belts of leather covered with gold[1]. The belts which have been found in the graves at Mycenae are entirely of gold but these are probably only for funeral purposes.

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[1]Op. cit., p. 250; Myc. Age, p. 203.

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[1]This bibliography is not meant to be a complete list of works on the subject. I have merely indicated the books and major articles which I have read and to which I have made frequent reference.

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